

ABSTRACT OF THE DISCLOSURE

Semiconductor devices containing group II-VI semiconductor materials are disclosed. The devices may include a p-n junction containing a p-type group II-VI semiconductor material and an n-type semiconductor material. The p-type group II-VI semiconductor includes a single crystal group II-VI semiconductor containing atoms of group II elements, atoms of group VI elements, and one or more p-type dopants. The p-type dopant concentration is greater than about 10^{16} atoms·cm⁻³, the semiconductor resistivity is less than about 0.5 ohm·cm, and the carrier mobility is greater than about 0.1 cm²/V·s. The semiconductor devices may include light emitting diodes, laser diodes, field effect transistors, and photodetectors.